

Spatio-Temporal Distribution and Relative Abundance of Hatchery and Wild Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) in Nearshore Waters of Skagit Bay, Puget Sound, Washington

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Abstract

Estuarine habitats are utilized by all anadromous salmonids, and are thought to be especially important to juvenile chinook salmon (*Oncorhynchus tshawytscha*). However, these environments are not well understood with respect to the ecology of juvenile chinook, including spatial and temporal distributions of hatchery and wild fish in littoral and neritic habitats. Adipose fin clip and coded wire tag marking of sub-yearling released hatchery chinook in the Skagit River system has been close to 100% since 1995. This provided a unique opportunity to compare wild and hatchery fish throughout the Skagit River basin, including the relatively understudied estuarine and marine environments. From May through October 2001, and February through October 2002, we conducted surface trawl (tows) studies exploring the differences in hatchery and wild juvenile chinook salmon abundance and distribution in the nearshore surface waters of Skagit Bay. During the 16 monthly sampling trips 13 sites were visited, and over 450 10-minute tows were completed. Eight of the 13 tows sites were adjacent to beach seining locations where a total of over 900 beach seine sets were completed. Chinook presence in tows samples persisted later in the year than in beach seine samples, indicative of an offshore transition of fish over time. The overall percentage of wild chinook in tows catches was significantly lower than in beach seine samples. For example, in 2002 wild chinook comprised 98%, 82%, and 73%, respectively, of chinook in small beach seine (24-m), large beach seine (37-m), and tows catches. Wild chinook showed significantly broader distributions than hatchery chinook with respect to time, space, and individual size. These results suggest that wild chinook utilize nearshore estuarine habitats more fully than do hatchery chinook.